



Rediscovering species: redescription of *Bryconops gracilis* (Characiformes: Iguanodectidae), an often-misidentified species

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A redescription of *Bryconops gracilis* is provided, a species poorly known for more than a century. *Bryconops gracilis* differs from all congeners by having the following combination of features: eight branched pelvic-fin rays, 31–36 anal-fin rays, 15–17 predorsal scales arranged in a regular series, two rows of premaxillary teeth, and 53–60 lateral-line scales. The species was often misidentified as *B. alburnoides* by sharing an overall elongated body shape, caudal fin yellowish in life, and a high number of lateral-line scales. A diagnosis between *B. alburnoides* and *B. gracilis* is provided. The holotype of *B. gracilis* which for many years had whereabouts unknown, was recovered, examined and illustrated by CT-Scan. Additionally, more detailed information about the type locality, morphology, color pattern (including in living specimens), habitat and distribution pattern of species are provided.

Keywords: Amazon basin, *Bryconops alburnoides*, *Bryconops melanurus*, Taxonomy, Thayer expedition.

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A redescricao de *Bryconops gracilis*, uma espécie pouco conhecida por mais de um século, é fornecida. *Bryconops gracilis* difere de todas as congêneres por apresentar a seguinte combinação de caracteres: oito raios ramificados na nadadeira pélvica, 31–36 raios ramificados na nadadeira anal, 15–17 escamas pré-dorsais dispostas em uma série regular, duas séries de dentes no pré-maxilar e 53–60 escamas na linha lateral. A espécie foi frequentemente identificada erroneamente como *B. alburnoides* por compartilhar a forma geral do corpo alongada, nadadeira caudal amarelada em vida e um grande número de escamas na linha lateral. Uma diagnose entre *B. alburnoides* e *B. gracilis* é fornecida. O holótipo de *B. gracilis* que por muitos anos teve paradeiro desconhecido, foi recuperado, examinado e ilustrado através de CT-Scan. Adicionalmente, informações mais detalhadas sobre a localidade tipo, morfologia, padrão de coloração (incluindo em espécimes vivos), habitat e padrão de distribuição da espécie são fornecidas.

Palavras-chave: Bacia amazônica, *Bryconops alburnoides*, *Bryconops melanurus*, Expedição Thayer, Taxonomia.

INTRODUCTION

Bryconops Kner, 1858 currently includes 27 valid species, widely distributed throughout cis-andean South America, along the Amazon, Orinoco, Paraguay, São Francisco river basins, and along coastal rivers from Guyana to the Parnaíba River basin in northeastern Brazil (Guedes *et al.*, 2019; Silva-Oliveira *et al.*, 2019a,b, 2020). The monophyly of the genus has never been satisfactorily elucidated, tested based solely on the analysis of *Bryconops affinis* (Günther, 1864), *B. caudomaculatus* (Günther, 1864), and *B. melanurus* (Bloch, 1794), and it was supported by both morphological and molecular data (Mirande, 2010, 2018). Thus, the diagnosis of *Bryconops* is currently recognized by three putative synapomorphies, *i.e.*, latero-supraorbital sensory canal extending posteriorly onto nuchal scales, sharply curved ventral edge of the maxilla posteriorly, and presence of well-developed infraorbital latero-sensory canal (Chernoff, Machado-Allison, 1999, 2005).

Kner (1858) proposed *Bryconops* to include initially two new species (*B. alburnoides* Kner, 1858 and *B. lucidus* Kner, 1858 (= *B. alburnoides*). Later on, Günther (1864) proposed the subgenus *Creatochanes* Günther, 1864 within *Tetragonopterus* Cuvier, 1816 to allocate *T. (C.) melanurus*, *T. (C.) affinis*, and *T. (C.) caudomaculatus*. Almost 30 years later, Eigenmann, Eigenmann (1891) elevated *Creatochanes* to the generic level. A few years later, Eigenmann (1908), described a new *Creatochanes* species (*C. gracilis* = *Bryconops gracilis*) from the rio Tapajós based on specimens collected during the Thayer Brazilian Expedition. Nonetheless, Knöppel *et al.* (1968) did not recognize *Creatochanes* as valid at the generic level, but as a subgenus of *Bryconops*. After that, *Bryconops* started to be recognized as more inclusive taxon.

Bryconops gracilis, a species described by Eigenmann (1908) from the rio Tapajós, is still poorly known regarding its taxonomy, biology, ecology and evolution. During the taxonomic revision of the genus which is being carried out by the first author (CSO),

the identity of *B. gracilis* was reevaluated. Thus, the main goal of this manuscript is to redescribe *Bryconops gracilis* based on the analysis of the holotype and recently collected additional material from a wide range of the Amazon basin.

MATERIAL AND METHODS

Counts and measurements were taken on the left side of specimens, whenever possible, using a digital caliper to the nearest 0.1 mm. Methodology followed Fink, Weitzman (1974) and Silva-Oliveira *et al.* (2019a,b). Measurements are expressed as percentages of standard length (SL), except for subunits of the head, which are expressed as percentages of head length (HL).

Counts of horizontal scale rows include the scale row immediately below the lateral line to the scale row nearest to the insertion of the first pelvic-fin ray. Counts of vertebrae, supraneurals, pterygiophores, procurrent caudal-fin rays, gill rakers on the first branchial arch, and branchiostegal rays were taken from cleared and stained (c&s) specimens, prepared according to Taylor, Van Dyke (1985). Additional counts of vertebrae, supraneurals, pterygiophores, and procurrent caudal-fin rays were obtained from 11 specimens X-rayed in a Faxitron® LX-60 cabinet. Total vertebrae number includes the four vertebrae of the Weberian apparatus considered separately, and preural centrum 1 plus ural centrum 1 (PU1+U1) counted as a single vertebra.

In the description, counts are followed by frequencies between parentheses; asterisk indicates holotype counts. The map was elaborated at QGIS 2.4.0 Chugiak©. Institutional abbreviations follow Sabaj (2020).

RESULTS

Bryconops gracilis (Eigenmann, 1908)

(Figs. 1–4A, 5, 6A; Tab. 1)

Cretochanes gracilis Eigenmann, 1908:106 [original description; type locality: rio Tapajos, Brazil].

Bryconops cf. *gracilis*. —Ferreira, 1993:15, 48, 77 [Brazil, rio Trombetas basin: abundance and distribution].

Bryconops gracilis. —Silva-Oliveira *et al.*, 2019a:3, 8, 12, fig. 7b,c [rio Xingu basin; photo].

Diagnosis. *Bryconops gracilis* differs from all congeners, except *B. alburnoides*, by the higher number of branched pelvic- (8 *vs.* 7) and anal-fin rays (31–36 *vs.* 19–30), predorsal scales (15–17 *vs.* 8–14), and lateral-line scales (53–62 *vs.* 9–49). It is distinguished from *B. alburnoides* by possessing two rows of premaxillary teeth (*vs.* three), by having predorsal scales arranged in a regular series (*vs.* predorsal scales irregularly arranged; Fig. 4B), and an isognathous mouth (*vs.* upper jaw longer than lower jaw). Additionally, *B. gracilis* can be diagnosed from *B. alburnoides* by the coloration of the caudal fin lobes in living

specimens (caudal fin with a yellow patch restricted to dorsal lobe *vs.* both dorsal and ventral lobes fully yellow).

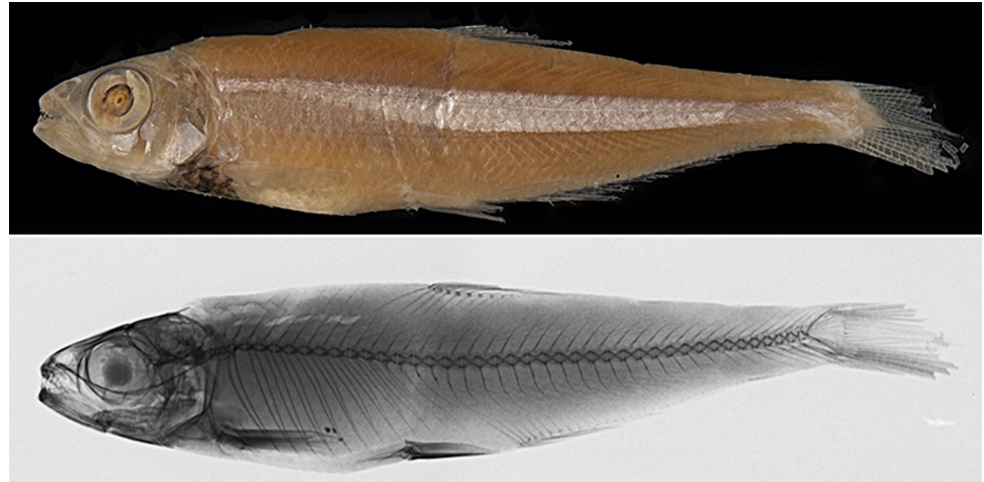


FIGURE 1 | *Bryconops gracilis*, MCZ 20868, holotype, 61.8 mm SL, Brazil, Pará State, rio Tapajós. In alcohol (above) and radiograph (below) specimen.

TABLE 1 | Morphometric data of *Bryconops gracilis*. Values of holotype (H) are not included in the ranges and means. N = Number of specimens, SD = Standard deviation.

	H	N	Range	Mean	SD
Standard length (mm)	61.8	42	36.4–129.8	94.8	–
Percents of standard length					
Snout to dorsal-fin origin	50.2	42	46.9–53.7	50.0	1.5
Snout to anal-fin origin	59.9	42	56.4–65.6	62.2	2.0
Snout to pelvic-fin origin	46.9	42	44.6–49.7	47.5	1.2
Pelvic-fin length	–	31	9.9–14.6	12.8	1.2
Snout to pectoral-fin origin	22.7	42	21.8–26.9	23.4	1.0
Pectoral-fin length	–	31	14.3–21.9	16.8	1.5
Dorsal-fin base length	12.1	42	10.5–13.9	12.1	0.9
Depth at dorsal-fin origin	19.4	42	18.4–24.8	23.0	1.4
Dorsal-fin terminus- adipose origin	25.9	42	24.0–29.2	26.5	1.4
Dorsal-fin origin- adipose origin	38.8	42	35.4–41.2	38.8	1.3
Adipose terminus to hypural plate	10.5	42	10.2–15.0	11.9	1.1
Anal-fin base length	29.1	42	24.7–33.5	30.7	1.7
Caudal-peduncle length	9.7	42	7.8–13.3	10.2	1.1
Caudal-peduncle depth	7.3	31	6.3–8.2	7.3	0.4
Head length	21.0	42	19.6–26.1	21.6	1.4
Maxillary length	9.7	42	8.2–12.4	9.7	0.8
Snout length	6.8	42	4.7–6.9	5.6	0.5
Horizontal orbit diameter	8.1	42	7.3–10.7	8.5	0.8
Percents of head length					
Maxillary length	46.2	42	40.2–50.6	45.1	2.5
Snout length	–	42	23.0–28.9	26.1	1.4
Horizontal orbit diameter	38.4	42	35.5–42.7	39.4	1.7
Tip of snout to tip of supraoccipital	92.3	42	91.4–102.4	94.9	2.1
Posterior margin of orbit to end of opercle	–	42	28.9–36.9	33.2	1.8

Description. Morphometric data presented in Tab. 1. Body elongated, compressed, greatest body depth located just anterior to dorsal-fin origin. Dorsal body profile slightly convex from margin of upper lip to end of supraoccipital spine; from that point to dorsal-fin origin straight and posteroventrally inclined along dorsal-fin base, straight from end of dorsal fin to adipose-fin base, and slightly concave from that point to anterior most dorsal procurent caudal-fin rays. Ventral profile of head and body slightly convex from lower lip to pelvic-fin origin, and straight from the latter point to anal-fin origin. Ventral profile straight and posterodorsally inclined along anal-fin base. Ventral profile of caudal peduncle slightly concave.

Mouth terminal (Fig. 2). Posterior extension of maxillary not reaching junction between second and third infraorbital bones; third infraorbital moderately developed, not reaching preopercle ventrally. Supraorbital bone present, not reaching sixth infraorbital posteriorly. Premaxillary teeth in two rows, with central cusp higher than remaining; outer tooth row irregular, with 3 (3), 4* (27) or 5 (21) tri- to pentacuspoid teeth; inner tooth row with 4 (2) or 5* (50) penta- to heptacuspoid teeth. Maxilla lacking teeth* (51) or with 1 (3) conical tooth. Dentary with 5* (24), 6 (27) or 7 (1) tri-, penta-, or heptacuspoid teeth, followed by 1–4 smaller, conical teeth (Figs. 2–3).

Dorsal-fin rays ii,9* (54); first unbranched ray about one-half the length of second unbranched ray. Dorsal-fin origin situated posterior to vertical through pelvic-fin origin and near middle of body. Posterior margin of dorsal fin straight to slightly concave. Adipose-fin origin approximately at vertical through 19th or 20th anal-fin branched rays. Principal caudal-fin rays 8+9* (54). Lobes of caudal fin unequal, upper lobe with rounded tip, lower lobe longer and more pointed. Dorsal procurent caudal-fin rays 10 (1), 11 (2), 12 (1), or 13 (1), ventral procurent caudal-fin rays 11 (1), 10 (2), 12 (2).

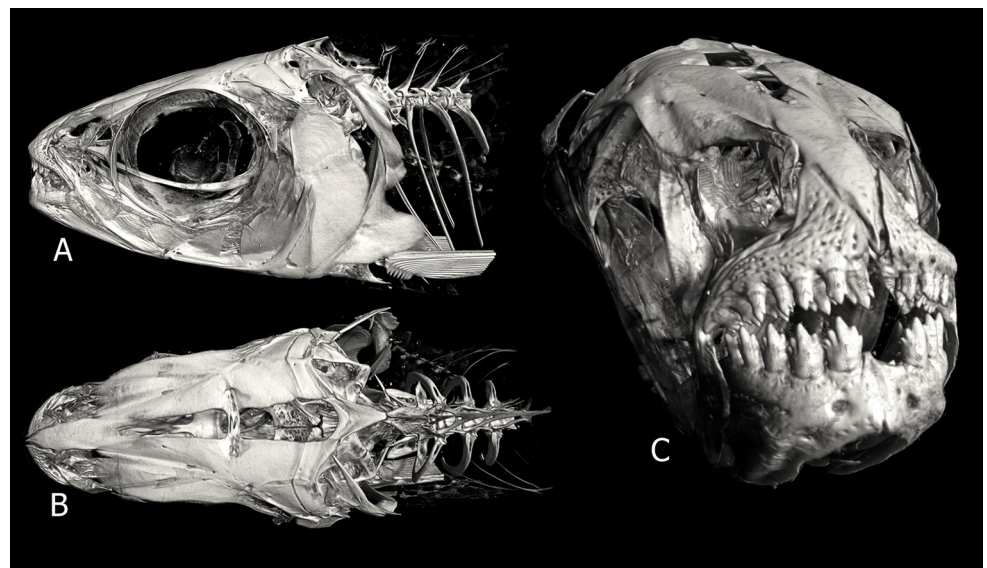


FIGURE 2 | Computed tomography renderings of anterior portion in lateral (A), dorsal (B), and anterior (C) views of the head of holotype of the *Bryconops gracilis*.

Pectoral-fin rays i, 11 (5), 12 (35) or 13 (9). Tip of pectoral fin slightly beyond half the distance between origins of pectoral and pelvic fins. Pelvic-fin rays i, 8* (54). Pelvic-fin origin anterior to vertical through first dorsal-fin ray. Anal-fin rays iv, 30 (8), 31* (10), 32 (12), 33 (8), 34 (5), 35 (2) or 36 (2). Anal-fin origin posterior to vertical through base of last dorsal-fin ray. Distal margin of anal fin slightly concave, with last unbranched ray and first three branched rays slightly longer than remaining rays.

Scales cycloid, moderately large, with few (5–7) well-marked *radii*; *circuli* only present anteriorly. Lateral line with 53 (4), 54* (18), 55 (11), 56 (8), 57 (8), 58 (3), 59 (2), 60 (1) perforated scales until base of caudal-fin rays. Scale rows between lateral line and dorsal-fin origin 8* (49) or 9 (1); scale rows between lateral line and pelvic-fin origin 3 (3) or 4* (48). Predorsal scales 15 (3), 16 (24) or 17 (13) in a regular series (Fig. 4A). Scale rows around caudal peduncle 15 (17) or 16 (26). Precaudal vertebrae 18* (9) or 19 (3); caudal vertebrae 23 (4) or 24 (8); total vertebrae 42 (1), 43* (9) or 44 (2). Supraneurals 8* (14) or 9 (2). First dorsal-fin pterygiophore located between 12th and 13th or between 13th and 14th vertebrae. First anal-fin pterygiophore located between 19th and 20th vertebrae.

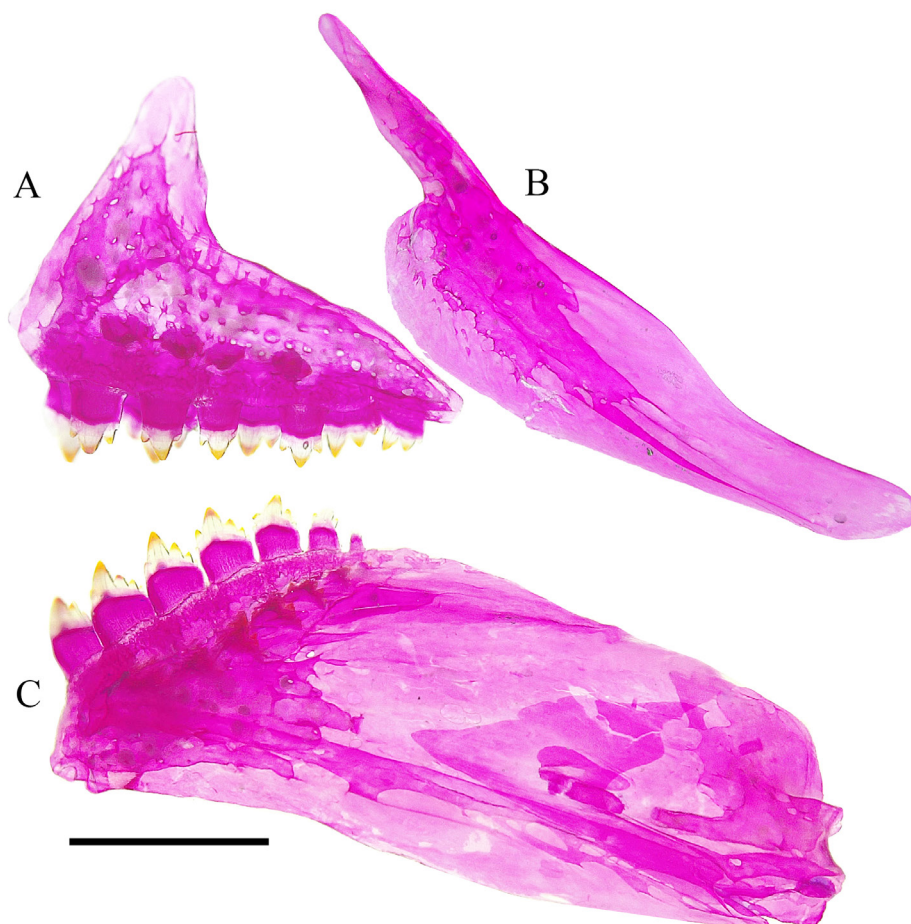


FIGURE 3 | *Bryconops gracilis*, INPA 46124, 122.7 mm SL (c&s). Lateral view of left side: **A**. Premaxillary; **B**. Maxillary; and **C**. Dentary. Scale bar = 1 mm.



FIGURE 4 | Arrangement of the scales of the predorsal region of: **A.** *Bryconops gracilis*, INPA 59629, 72.3 mm SL, rio Uatumã, Amazonas State, Brazil. **B.** *Bryconops alburnoides*, INPA 27413, 114.0 mm SL; lago Catuá, rio Amazonas, Amazonas State, Brazil.

Total gill rakers of first gill arch 18 (2), 19 (1) or 20 (2); 2 (4) or 3 (1) on hypobranchial, 7 (2), 8 (2) or 9 (1) on ceratobranchial, 1 (5) on cartilage between ceratobranchial and epibranchial, and 8 (4) or 9 (1) on epibranchial. Gill rakers setiform. Branchiostegal rays 4 (5), 3 (5) on anterior ceratohyal and 1 (5) on posterior ceratohyal.

Coloration in alcohol. Overall color of body dark yellow to light brown. Snout, anterior portion of maxilla, dorsal region of head, supraorbital, sixth infraorbital and mid-dorsal region of body dark. Infraorbital bones, posteromedial portion of maxilla, opercle and gular region whitish to yellowish, with few scattered chromatophores. Humeral blotch absent. Dark or silvery midlateral stripe extending immediately behind dorsal portion of opercle to caudal-fin base, slightly more conspicuous at vertical through dorsal fin (Fig. 5).

Scales on dorsal and dorsolateral portion of body with chromatophores concentrated at edges, forming slightly reticulate pattern. Ventrolateral scales with scattered chromatophores, not forming reticulate pattern. Dorsal, adipose, pectoral, pelvic and anal fins hyaline with few scattered chromatophores. Caudal pigmented with dark

chromatophores, distal half of dorsal and ventral lobes more pigmented, forming black band (Fig. 5).

Coloration in life. Based on freshly captured specimens. Overall body coloration greenish to silvery. Snout and lips light brown. Opercle, infraorbital bones, posteromedial region of maxilla and ventral region of head silvery. Dorsal margin of eye yellow, lateral and ventral margins of eye silvery. Adipose fin yellow. Caudal fin with yellow area at base of dorsal lobe. Dorsal, pectoral, pelvic and anal fins similar to preserved specimens (Fig. 6A).

Sexual dimorphism. Mature males of *Bryconops gracilis* with hooks on pelvic- and anal-fins rays. Pelvic-fin rays with 3–4 small hooks. Anal-fin hooks larger and more numerous (4–8 per ray), present from 3rd unbranched ray to 15th branched ray.

Geographical distribution. *Bryconops gracilis* is distributed across the central and lower Amazon basin, Brazil, and also in the río Ventuari, upper río Orinoco basin in Venezuela (Fig. 7).



FIGURE 5 | *Bryconops gracilis*, UFOPA-I 679: **A.** 95.2 mm SL; **B.** 87.3 mm SL; **C.** 38.4 mm SL; **D.** 22.1 mm SL. Brazil, Pará State, Santarém, rio Tapajós. Scale bars =1 cm.



FIGURE 6 | A. *Bryconops gracilis* (immediately after fixation) UFOPA-I 687, 94.2 mm SL, rio Arapiuns. B. *Bryconops alburnoides*, UFOPA-I 1356, 97.2 mm SL, rio Tapajós.

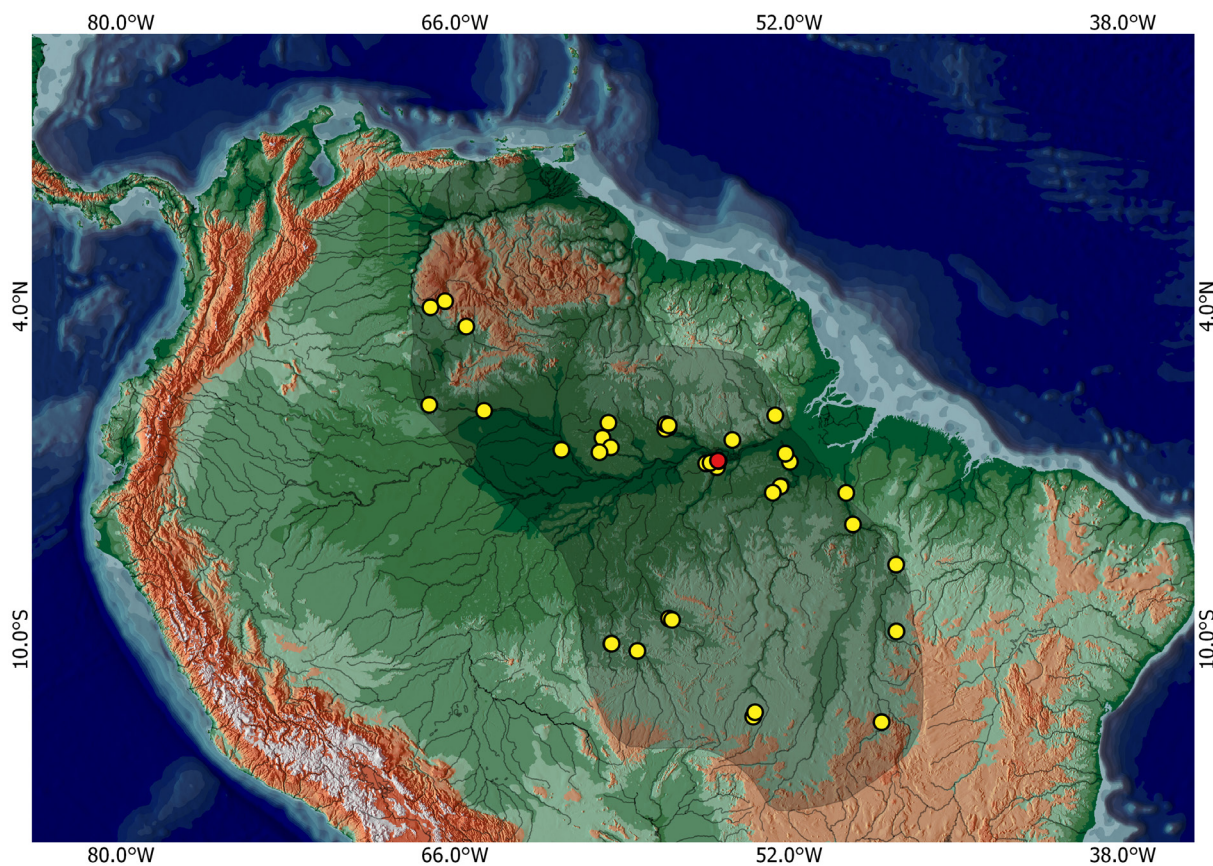


FIGURE 7 | Map of northeastern South America, showing distribution of *Bryconops gracilis*. Red circle represents the type locality, the yellow circles represent remaining material analyzed. The gray area represents the pattern “Eastern Amazon” (*sensu* Dagosta, de Pinna, 2019).

Material examined. Holotype of *Creatochanes gracilis*: MCZ 20868, 61.8 mm SL, Brazil, Pará, Santarém, rio Tapajós, Aug 1865, Dexter, James and Talisman (photos, radiographs and CT-Scan only).

Non-type specimens: Brazil: Rio Jari basin: INPA 39220, 3, 25.2–51.7 mm SL, Pará, rio Jari, Monte Dourado, 00°34'15.99"S 52°34'13.98"W, E. Ferreira & S. Amadio, 20 Jun 1987. **Rio Maicuru basin:** MCP 51813, 5, 30.7–56.3 mm SL; ZUEC 12134, 5, 34.3–56.6 mm SL, Pará, Monte Alegre, rio Maicuru, at road PA–254, 01°36'47.00"S 54°22'37.00"W, R. E. Reis *et al.*, 3 Dec 2015. **Rio Madeira basin:** INPA 26680, 1, 86.3 mm SL, Amazonas, rio Sucunduri, Apuí, 07°06'11"S 59°41'23"W, L. Rapp Py-Daniel *et al.*, 28 Jun 2016; INPA 40997, 45, 23.3–41.3 mm SL, Mato Grosso, rio Aripuanã, Igarapé Praia Grande, Novo Aripuanã, 10°09'19.17"S 59°26'15.21"W, team INPA, 9 Nov 1976. **Rio Negro basin:** INPA 30701, 1, 103.5 mm SL, Amazonas, rio Negro, rio Carabinari, Novo Airão, 02°01'25.02"S 61°32'35.86"W, L. Carvalho, 25 Oct 2004; INPA 37773, 1, 113.9 mm SL, Amazonas, rio Negro, Santa Isabel do Rio Negro, Igarapé Darahá, 00°23'9.00"S 67°47'8.00"W, R. de Oliveira, R. Silva & P. Ito, 30 Mar 2012; INPA 43007, 1, 111.3 mm SL, Amazonas, rio Negro, São Gabriel da Cachoeira, Cachoeira Curucui, 00°08'15.84"S 67°05'3.77"W, T. Roberts, A. Oliveira & R. Oliveira, 8 Dec 2013. **Rio Tapajós basin:** MCP 48844, 2, 51.2–74.7 mm SL, Pará, rio Tapajós, Belterra, 02°45'5.00"S 55°01'12.00"W, W. G. R. Crampton *et al.*, 24 Nov 2013; MCP 52337, 2, 114.6–121.1 mm SL, Pará, rio Arapiuns, Santarém, 02°35'35.91"S 55°28'20.74"W, J. D. Bogotá-Gregory & C. Silva-Oliveira, 14 Nov 2016; INPA 45523, 13, 22.9–31.7 mm SL, Mato Grosso, rio Teles Pires, rio São Benedito, Paranaíta, Mato Grosso, 09°06'13.00"S 57°01'53.00"W, 11 Dec 2012; MZUSP 77712, 1, 70.8 mm SL, Mato Grosso, rio Juruena, 10°27'52.07"S 58°21'27.32"W, F. Machado *et al.*, 26 July 1997; UFOPA-I 679, 4, 52.3–67.1 (2 c&s, 65.4–73.7 mm SL), Pará, rio Arapiuns, Santarém, 02°21'26.78"S 55°03'43.00"W, J. D. Bogotá-Gregory & C. Silva-Oliveira, 26 Nov 2015. UFOPA-I 687, 94.2 mm SL, rio Arapiuns, Santarém, Pará, 02°24'24"S 55°10'45"W, C. Silva-Oliveira, J. Bogotá-Gregory & J. Fontenelle, 16 Nov 2016. ZUEC 13907, 2, 90.3–100.5 mm SL, Pará, Santarém, rio Tapajós, lake at Surucuá, 02°53'28"S 55°10'33"W, J. D. Bogotá-Gregory & C. Silva-Oliveira, Nov 2016. ZUEC 13908, 4, 59.0–91.9 mm SL, Pará, Santarém, rio Tapajós, lake at Jaguari, 02°54'6"S 55°04'22"W, J. D. Bogotá-Gregory & C. Silva-Oliveira, Nov 2016. **Rio Tocantins basin:** MCP 53084, 1, 132.2 mm SL, Maranhão, rio Tocantins, Estreito, 06°50'33.00"S 47°30'29.00"W, Biota Projetos, 25 May 2013; INPA 12316, 1, 106.2 mm SL, Pará, rio Tocantins, Itupiranga, 5°8'12.18"S 49°19'12.62"W, team INPA, 1 Nov 1980; INPA 12404, 5, 76.9–87.7 mm SL, Pará, rio Tocantins, Tucuruí, 03°49'46.40"S 49°36'6.68"W, team INPA, 13 Nov 1981. **Rio Trombetas basin:** INPA 12394, 4, 94.8–98.8 mm SL, Pará, rio Trombetas, above cachoeira Porteira, Oriximiná, 01°03'59.41"S 57°03'39.49"W, E. Ferreira, 24 May 1988. **Rio Uatumã basin:** INPA 46124, 32, 103.5–123.3 (3 c&s, 102.2–122.7) mm SL, Amazonas, rio Pitinga, Presidente Figueiredo, 00°53'15.66"S 59°34'25.18"W, J. Birindelli, L. Rapp Py-Daniel, F. Jerep & V. Machado, 19 July 2014. INPA 59629, 5, 68.2–72.3 mm SL, rio Uatumã, Presidente Figueiredo, Amazonas, 01°54'35"S 59°27'37", A. G. Biffi & C. Silva-Oliveira, 20 Jul 2018. **Rio Xingu basin:** INPA 43319, 1, 111.1 mm SL, Pará, rio Xingu, Porto de Moz, 02°11'0.33"S 52°08'55.18"W; MZUSP 91304, 1, 87.4 mm SL, Mato Grosso, rio Curisevo, rio Xingu, Gaúcha do Norte, 13°13'10.16"S

53°29'59.98"W, C. Moreira *et al.*, 19 Out 2004; MZUSP 91305, 2, 81.3–103.5 mm SL, Mato Grosso, rio Curisevo, rio Xingu, Gaúcha do Norte, 13°02'5.00"S 53°25'23.03"W, C. Moreira *et al.*, 19 Out 2004; MZUSP 107233, 1, 92.4 mm SL, Pará, Altamira, 03°33'44.56"S 52°21'3.43"W, team UFPA, 12 Dec 2000. **Venezuela: Amazonas: Rio Orinoco basin:** ANSP 161542, 10 of 20, 27.7–42.6 mm SL, at playa ca. 0.5 km above La Esmerada, 03°09'N 65°32'W, B. Chernoff *et al.*, 12 Mar 1987; ANSP 191228, 5 of 10, 30.7–42.7 mm SL, near mouth of Rio Ventuari, 03°57'29"N 67°01'56"W, M. H. Sabaj *et al.*, 4 April 2004; MZUSP 106371, 1, 27.1–36.8 mm SL, rio Ventuari, 04°12'56.15"N 66°25'21.81"W, J. Birindelli, N. Lujan & V. Meza, 15 April 2010.

DISCUSSION

As mentioned above, *Bryconops gracilis* has been misidentified for more than a century. One of the main reasons that has caused problems on the identification of *B. gracilis* was its terse, short original description, without any illustration (Eigenmann, 1908). In addition, the species was originally considered similar to *Bryconops melanurus* (then in the genus *Cretochanes*; Eigenmann, 1908:106), a very distinct congener. To make matters worse, its holotype was considered missing for a long time (*e.g.*, Lima *et al.* 2003). Currently, *B. gracilis* and *B. melanurus* are assigned to distinct subgenera (*Bryconops* and *Cretochanes*, respectively) based on number of maxillary teeth, posterior extension of the maxilla, and degree of ossification of the gill rakers (Chernoff, Machado-Allison, 1999, 2005).

The separation of these two subgenera was not available at the time of the original description, and the allusion of a similarity between *B. gracilis* and *B. melanurus* has probably generated an erroneous perception that both species shared similar features. However, as mentioned by Eigenmann (1908), *B. gracilis* has an edentulous maxilla with its posterior margin not reaching the articulation between second and third infraorbitals, whereas *B. melanurus* presents 1–3 maxillary teeth and posterior margin of maxilla reaching articulation between second and third infraorbitals. Therefore, *B. gracilis* is actually allocated in the subgenus *Bryconops*, while *B. melanurus* belongs to the subgenus *Cretochanes* (Silva-Oliveira *et al.*, 2015:134).

Additionally, Eigenmann (1908) provided the following counts of *Bryconops gracilis*: 31 branched anal-fin rays, eight rows of scales above lateral line, and 54 lateral-line scales. Among all congeners, only *B. alburnoides* possesses more than 30 branched anal-fin rays, eight or nine rows of scales above lateral line, and more than 50 lateral-line scales. Indeed, the specific epithet (*gracilis*) alludes to the fact that the species has a slender body, another character shared with *B. alburnoides*.

A recent thorough search for the holotype of *Bryconops gracilis* was conducted by the MCZ team in the MCZ collection. A single *B. gracilis* specimen was recorded under the catalog number MCZ 20868, which corresponds to the description by Eigenmann (1908), and consequently, is herein considered as the formerly missing holotype of *B. gracilis*. High-resolution tomographic images of the cranium and the most relevant post-cranial structures of the holotype are herein presented (Fig. 2).

In sum, both the similarity between *Bryconops gracilis* and *B. alburnoides*, as well as the misleading allusion to *B. melanurus* in its original description, caused the identity of the

species to remain virtually unknown until now. In fact, specimens of *B. gracilis* have been typically misidentified in ichthyological collections as *B. alburnoides*. However, they can be easily diagnosed from each other by the characters mentioned herein. Despite the morphological similarity, they have different distribution patterns. *Bryconops alburnoides* presents the typical lowland pattern (*sensu* Lima, Ribeiro, 2011), occurring in lowland areas and absent from shield-draining rivers, except for their lower portions, the so-called ria-lakes (e.g., rio Tapajós, rio Xingu). On the other hand, *B. gracilis* presents a “highland” pattern (*sensu* Lima, Ribeiro, 2011), occurring in tributaries of the Amazon basin draining both Brazilian and Guiana shields, a pattern called by Dagosta, de Pinna (2019) as “Eastern Amazon”.

Although the precise type locality of *Bryconops gracilis* was not provided in the original description (*i.e.*, “Rio Tapajós”) (Eigenmann, 1908), the compilation of information about the Thayer Expedition from which the specimens studied by Eigenmann (1908) originate (Dick, 1977; Higuchi, 1996) indicates that this locality refers to lower rio Tapajós, nearby Santarém, Pará State. According to Dick’s (1977) notes, the possible locality and day of the collection in rio Tapajós in 1865 is: “From Santarém, at the mouth of the rio Tapajoz, Dexter, James and Talisman, 26 august, to explore the rio Tapajoz”. Afterwards, several members of the Thayer expedition ascended the Amazon River and many of its tributaries up to Tabatinga, at the border with Leticia, Colombia (then belonging to Peru), and only returned to Santarém in next year (1866), where they remained for a short period without mentioning any field activity: “On 21 january the party was again at Obydos, and 22 january at Santarém... They left Santarém 24 january for Monte Alegre...”. Consequently, we consider that the type-locality can be restricted to the surroundings of Santarém, from where many specimens examined in the present study were collected. Furthermore, the present redescription of *B. gracilis* elucidates a taxonomic problem that persisted for more than a hundred years, attributing the correct name to a common, abundant, and widespread species throughout the Amazon and upper Orinoco basins.

Comparative material examined. *Bryconops affinis*: **Guyana**: BMNH 1969.12.13.1, holotype; ZUEC 6557, 10, 69.0–95.0 mm SL. *Bryconops alburnoides*: **Brazil**: NMW 5994, 89.0 mm SL, syntype. INPA 12316, 1, 107.5 mm SL; INPA 27413, 114.0 mm SL; INPA 30701, 1, 145.7 mm SL; INPA 37794, 1, 81.1 mm SL. INPA 36079, 6, 112.3–115.1 mm SL. MZUSP 17586, 7, 92.9–119.0 mm SL. MZUSP 72877, 1, 124.7 mm SL. ZUEC 9836, 1, 49.5 mm SL. ZUEC 12563, 1, 123.6 mm SL. ZUEC 13388, 1, 84.9 mm SL. *Bryconops allisoni*: **Brazil**: INPA 56754, 72.5 mm SL, holotype. INPA 56755, 15, 27.6–68.6 mm SL, paratypes. *Bryconops caudomaculatus*: **South America**: BMNH 1852.9.13.74, 54.5 mm SL, holotype. **Brazil**: INPA 14301, 5, 61.5–66.0 mm SL. MZUSP 107705, 3, 62.0–68.0 mm SL. *Bryconops chernoffi*: **Brazil**: ZUEC 14796, 59.6 mm SL, holotype. INPA 56753, 5, 39.9–69.1 mm SL, paratypes. *Bryconops colanegra*: **Brazil**: INPA 10699, 4, 95.9–105.8 mm SL. LBP 21170, 42, 31.6–94.7 mm SL. *Bryconops colaroja*: **Venezuela**: ANSP 168005, 10 of 43, 21.3–31.6 mm SL, paratypes. *Bryconops cyrtogaster*: **French Guiana**: BMNH 1926.515–524, 10, 48.0–48.5 mm SL, syntypes. *Bryconops disruptus*: **Brazil**: INPA 42819, 14, 30.9–48.6 mm SL. *Bryconops durbinae*: **Brazil**: UFOPA-I 337, 109, 18.2–61.0 mm SL. *Bryconops giacopinii*: **Brazil**: INPA 32636, 7, 57.1–67.7 mm SL. MZUSP 92299, 1, 111.3 mm SL. MZUSP 112372, 2, 24.4–67.5 mm SL. *Bryconops hexalepis*: **Brazil**: INPA 11240, 10, 71.5–76.7 mm SL. *Bryconops humeralis*: **Venezuela**: ANSP 159752, 10 of 60, 35.9–48.6 mm SL, paratypes. **Brazil**:

INPA 19638, 3, 49.8–66.3 mm SL. INPA 19634, 6, 53.8–83.5 mm SL. INPA 19636, 7, 31.3–79.6 mm SL. MZUSP 99439, 1, 94.9 mm SL. *Bryconops inpai*: **Brazil**: INPA 13249, 3, 63.2–72.9 mm SL. INPA 29524, 1, 66.7 mm SL. *Bryconops magoi*: **Venezuela**: ANSP 190886, 5, 79.7–80.9 mm SL. *Bryconops marabaixo*: **Brazil**: MZUSP 125767, 61.7 mm SL, holotype. MZUSP 101562, 5, 50.4–60.9 mm SL, paratypes, rio Jari. *Bryconops melanurus*: **Suriname**: ANSP 189268, 41.8–76.3 mm SL. ANSP 188687, 21, 27.8–65.9 mm SL. *Bryconops munduruku*: **Brazil**: INPA 46510, 76.6 mm SL, holotype. MCP 48315, 5, 34.0–79.6 mm SL, paratypes. *Bryconops piracolina*: **Brazil**: MZUSP 105731, 2, 32.9–40.1 mm SL, paratypes. MCP 44796, 69.0 mm SL, holotype. UFRO 22726, 69, 24.2–59.9 mm SL, rio Madeira; UFRO 22731, 64, 29.0–70.1 mm SL. *Bryconops sapezal*: **Brazil**: UFRO-I 022680, 20 of 60, 55.6–65.4 mm SL. *Bryconops rheoruber*: **Brazil**: INPA 57879, 49.7 mm SL, holotype; INPA 47456, 24, 46.1–54.9 mm SL, paratypes. *Bryconops tocantinensis*: **Brazil**: MCP 49199, 53.7, mm SL, holotype; MNRJ 44220,20, 28.8–53.9 mm SL, paratypes. *Bryconops transitorius*: **Guyana**: NMW 68532, 4, 57.1–79.2 mm SL, syntypes.

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Cárlison Silva-Oliveira: Conceptualization, Data curation, Investigation, Methodology, Project administration, Writing-original draft, Writing-review and editing.

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Lúcia Rapp Py-Daniel: Supervision, Writing-review and editing.

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